# *Cyclospora* Infection: Information for Health Care Providers



## What is *Cyclospora*?

*Cyclospora cayetanensis* is a unicellular parasite previously known as cyanobacterium-like or coccidia-like body (CLB). The first known human cases of illness caused by *Cyclospora* infection (i.e., cyclosporiasis) were reported in the medical literature in 1979. Cases have been reported with increased frequency from various countries since the mid 1980s, in part because of the availability of better techniques for detecting the parasite in stool specimens.

## How is *Cyclospora* transmitted?

Infected persons excrete the oocyst stage of *Cyclospora* in their feces. When excreted, oocysts are not infectious and may require from days to weeks to become infectious (i.e., to sporulate). Therefore, transmission of *Cyclospora* directly from an infected person to someone else is unlikely. However, indirect transmission can occur if an infected person contaminates the environment and oocysts have sufficient time, under appropriate conditions, to become infectious. For example, *Cyclospora* may be transmitted by ingestion of water or food contaminated with oocysts. Outbreaks linked to contaminated water, as well as outbreaks linked to various types of fresh produce, have been reported in recent years [1-7]. How common the various modes of transmission and sources of infection are, is not yet known, nor is it known whether animals can be infected and serve as sources of infection for humans.

## Who is at risk for infection?

Persons of all ages are at risk for infection. Persons living or traveling in developing countries may be at increased risk; but infection can be acquired worldwide, including in the United States. In some countries of the world, infection appears to be seasonal.

## What are the symptoms of infection?

The incubation period between acquisition of infection and onset of symptoms averages 1 week. *Cyclospora* infects the small intestine and typically causes watery diarrhea, with frequent, sometimes explosive, stools. Other symptoms can include loss of appetite, substantial loss of weight, bloating, increased flatus, stomach cramps, nausea, vomiting, muscle aches, low-grade fever, and persistent fatigue. If untreated, illness may last for a few days to a month or longer, and may follow a remitting-relapsing course. Some infected persons are asymptomatic.

## How is infection diagnosed?

Identification of this parasite in stool requires special laboratory tests that are not routinely done (see section on laboratory diagnosis). A single negative stool specimen does not rule out the diagnosis; three or more specimens may be required. Stool specimens should also be checked for other microbes that can cause a similar illness.

**How is infection treated?**

Trimethoprim/sulfamethoxazole (TMP/SMX), or Bactrim*, Septra*, or Cotrim*, has been shown in a placebo-controlled trial to be effective treatment for *Cyclospora* infection [8]. Adults should receive TMP 160 mg plus SMX 800 mg (one double-strength tablet) orally twice a day for at least 7 days. Children should receive TMP 5 mg/kg plus SMX 25 mg/kg twice a day for at least 7 days. Patients with AIDS may need higher doses and long-term maintenance treatment [9]. No alternative antibiotic regimen has been identified yet for patients who do not respond to or are intolerant of TMP/SMX. Anecdotal or unpublished data suggest that the following drugs are ineffective: albendazole, trimethoprim, azithromycin, nalidixic acid, norfloxacin, ciprofloxacin, tinidazole, metronidazole, quinacrine, tetracycline, doxycycline, and diloxanide furoate. Approaches to consider for treatment of such patients include observation and symptomatic treatment, use of an antibiotic whose effectiveness against *Cyclospora* is unknown or is based on limited data, or desensitization to TMP/SMX. The latter approach should be considered only for selected patients who require treatment, have been evaluated by an allergist, and do not have a life-threatening allergy.

**How is infection prevented?**

On the basis of currently available information, avoiding food or water that might be contaminated with stool is the best way to prevent infection. Reinfection can occur.

**Key points for the laboratory diagnosis of *Cyclospora* [10-11]:**

1. To maximize recovery of *Cyclospora* oocysts, first concentrate the stool specimen by the formalin-ethyl acetate technique (centrifuge for 10 minutes at 500 x g) and then examine a wet mount and/or a stained slide of the sediment.
2. *Cyclospora* oocysts are 8-10 microns in diameter (in contrast, *Cryptosporidium parvum* oocysts are 4-6 microns in diameter).
3. Ultraviolet fluorescence microscopy (UV excitation filter set at 330-365 nm or 450-490 nm) is a sensitive technique for rapidly examining stool sediments for *Cyclospora* oocysts, which autofluoresce (*Cryptosporidium parvum* oocysts do not). If suspect oocysts are found, bright-field microscopy can then be used to confirm that the structures have the characteristic morphologic features of *Cyclospora* oocysts (i.e., are nonrefractile spheres that contain undifferentiated cytoplasm or refractile globules).
4. On a modified acid fast-stained slide of stool (the technique used by most laboratorians), *Cyclospora* oocysts are variably acid fast (i.e., in the same field, oocysts may be unstained or stain from light pink to deep red). Unstained oocysts may have a wrinkled appearance; it is important to distinguish oocysts from artifacts that may be acid fast but do not have the all-important wrinkled morphology of the oocyst wall.
5. Using a modified safranin technique, oocysts uniformly stain a brilliant reddish orange if fecal smears are heated in a microwave oven during staining [12].
6. Although not recommended as an optimal technique for detection of *Cyclospora*, oocysts might be detected during a routine examination of a trichrome-stained slide of stool. The oocysts appear as clear, round, and somewhat wrinkled spheres, either 8-10 microns in diameter or slightly smaller because of shrinkage during the staining process.

**For additional information, visit the DPDx website:**
**http://www.dpd.cdc.gov/dpdx/**

**References:**


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**For more information:**


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